IN THE CLAIMS:

1. (Currently Amended): A method for enabling parity declustering in a balanced parity array of a storage system, <u>where an operating system performs</u> the method comprising the steps of:

combining a plurality of unbalanced stripe arrays to form the balanced array, each unbalanced stripe array having parity blocks on a set of storage devices that are disjoint from a set of storage devices storing data blocks; and

distributing assignment of storage devices to parity groups throughout the balanced array.

2. (Original): The method of Claim 1 further comprising the step of, after a single or double storage device failure, ensuring that all surviving data storage devices are loaded uniformly during reconstruction of the failed storage device or devices.

3. (Original): The method of Claim 1 wherein the storage system is a filer.

4. (Original): The method of Claim 1 further comprising the steps of:

dividing each storage device into blocks; and

organizing the blocks into stripes across the devices, wherein each stripe contains data and parity blocks from each of the devices of the balanced array.

5. (Original): The method of Claim 4 wherein the step of distributing comprises the step of selecting patterns of characters representing data storage devices of a stripe to thereby

3 change the association of the data storage devices with parity groups from stripe to stripe

4 of the balanced array.

1 6. (Original): The method of Claim 5 wherein the characters are binary numbers.

1 7. (Original): The method of Claim 5 wherein the characters are ternary numbers.

1 8. (Original): The method of Claim 1 further comprising the steps of:

2 configuring the balanced array as a RAID-4 style array;

3 initially under-populating the array with storage devices; and

4 adding storage devices until a fully populated array of predetermined size is

5 achieved.

1 9. (Original): The method of Claim 8 wherein the storage devices are disks.

1 10. (Original): A system that enables parity declustering in a balanced parity array of a

2 storage system, the system comprising:

3 a plurality of storage devices, each storage device divided into blocks that are fur-

4 ther organized into stripes, wherein each stripe contains data and parity blocks from each

5 of the devices of the balanced array;

6 a storage operating system including a storage layer configured to implement a

7 parity assignment technique that distributes assignment of devices to parity groups

8 throughout the balanced array such that all storage devices contain the same amount of

9 data or parity information; and

10   a processing element configured to execute the operating system to thereby in-

11   voke storage access operations to and from the balanced array in accordance with the

12   concentrated parity technique.

1   11. (Original): The system of Claim 10 wherein the storage layer further combines a

2   plurality of unbalanced stripe arrays to form the balanced array, each unbalanced stripe

3   array having parity blocks on a set of storage devices that are disjoint from a set of stor-

4   age devices storing data blocks.

1   12. (Original): The system of Claim 11 wherein the storage devices are disks and

2   wherein the storage layer is a RAID layer.

1   13. (Original): The system of Claim 12 wherein the RAID layer is implemented in logic

2   circuitry.

1   14. (Original): The system of Claim 10 wherein the storage system is a network-

2   attached storage appliance.

1   15. (Original): The system of Claim 10 wherein the storage devices are one of video

2   tape, optical, DVD, magnetic tape and bubble memory devices.

1   16. (Original): The system of Claim 10 wherein the storage devices are media adapted

2   to store information contained within the data and parity blocks.

17. (Original): Apparatus for enabling parity declustering in a balanced parity array of a storage system, the apparatus comprising:

means for combining a plurality of unbalanced stripe arrays to form the balanced array, each unbalanced stripe array having parity blocks on a set of storage devices that are disjoint from a set of storage devices storing data blocks; and

means for distributing assignment of devices to parity groups throughout the balanced array such that all storage devices contain the same amount of data or parity information.

18. (Original): The apparatus of Claim 17 further comprising:

means for dividing each storage device into blocks; and

means for organizing the blocks into stripes across the devices, wherein each stripe contains data and parity blocks from each of the devices of the balanced array.

19. (Original): The apparatus of Claim 18 wherein the means for distributing comprises means for selecting patterns of characters representing data storage devices of a stripe to thereby change the association of the data storage devices with parity groups from stripe to stripe of the balanced array.

20. (Original): A computer readable medium containing executable program instructions for enabling parity declustering in a balanced parity array of a storage system, the executable program instructions comprising program instructions for:

combining a plurality of unbalanced stripe arrays to form the balanced array, each unbalanced stripe array having parity blocks on a set of storage devices that are disjoint from a set of storage devices storing data blocks; and

7   distributing assignment of devices to parity groups throughout the balanced array

8   such that all storage devices contain the same amount of data or parity information.

1   21. (Original): The computer readable medium of Claim 20 further comprising program

2   instructions for:

3   dividing each storage device into blocks; and

4   organizing the blocks into stripes across the devices, wherein each stripe contains

5   data and parity blocks from each of the devices of the balanced array.

1   22. (Original): The computer readable medium of Claim 21 wherein the program in-

2   structions for distributing comprises program instructions for selecting patterns of charac-

3   ters representing data storage devices of a stripe to thereby change the association of the

4   data storage devices with parity groups from stripe to stripe of the balanced array.

1   23. –37. (Cancelled)

1   38. (Currently Amended) A method for declustering a parity array having a plurality of

2   storage devices, where an operating system performs the method comprising the steps of:

3   assigning a first plurality of data and parity blocks to a first parity group; and

4   assigning a second plurality of data and parity blocks to a second parity group, the

5   first and second parity groups being independent from each other and distributed

6   throughout the plurality of storage devices of the parity array.

1   39. (Cancelled)

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1   40. (Currently Amended) A method for declustering a parity array having a plurality of

2   storage devices, <u>where an operating system performs</u> the method comprising the step of:

3   assigning a plurality of data and parity blocks to a plurality of parity groups, the

4   plurality of parity groups being independent from each other and distributed throughout

5   the plurality of storage devices of the parity array.

1   41. (Currently Amended) A <u>disk array having a</u> declustered parity array, comprising:

2   a plurality of storage devices having a first and second parity group;

3   a first plurality of data and parity blocks assigned to the first parity group; and

4   a second plurality of data and parity blocks assigned to the second parity group,

5   the first and second parity groups being independent from each other and distributed

6   throughout the plurality of storage devices of the parity array.

1   42. (Cancelled)

1   43. (Currently Amended) A <u>disk array having a</u> declustered parity array, comprising:

2   a plurality of storage devices having a plurality of parity groups; and

3   a plurality of data and parity blocks assigned to the plurality of parity groups, the

4   plurality of parity groups being independent from each other and distributed throughout

5   the plurality of storage devices of the parity array.

1   44. (Currently Amended) A <u>disk array having a</u> declustered parity array, comprising:

2   a plurality of storage devices;

3   means for assigning a first plurality of data and parity blocks to a first parity

4   group; and

5   means for assigning a second plurality of data and parity blocks to a second parity

6   group, the first and second parity groups being independent from each other and distrib-

7   uted throughout the plurality of storage devices of the parity array.

1   45. (Cancelled)

1   46. (Currently Amended) A <u>disk array having a</u> declustered parity array, comprising:

2   a plurality of storage devices; and

3   means for assigning a plurality of data and parity blocks to a plurality of parity

4   groups, the plurality of parity groups being independent from each other and distributed

5   throughout the plurality of storage devices of the parity array.

1   47. – 54. (Cancelled)